

This is very manifest by the *sealed Thermometers*, which I have, by several tryals, at last brought to a great certainty and tenderneſs: for I have made ſome with ſtems above four foot long, in which the expanding Liquor would ſo far vary, as to be very neer the very top in the heat of Summer, and pretty neer the bottom at the coldeſt time of the Winter. The Stems I uſe for them are very thick, ſtraight, and even Pipes of Glaſs, with a very ſmall *perforation*, and both the head and body I have made on purpoſe at the Glaſs-houſe, of the ſame metal whereof the Pipes are drawn: theſe I can eaſily in the flame of a Lamp, urged with the blaſt of a pair of Bellows, ſeal and cloſe together, ſo as to remain very firm, cloſe and even; by this means I joyn on the body firſt, and then fill both it and a part of the ſtem, proportionate to the length of the ſtem and the warmth of the ſeaſon I fill it in, with the beſt rectified *Spirit of Wine* highly ting'd with the lovely colour of *Cocheneel*, which I deepen the more by pouring ſome drops of common *Spirit of Urine*, which muſt not be too well rectified, becauſe it will be apt to make the Liquor to curdle and ſtick in the ſmall perforation of the ſtem. This Liquor I have upon tryal found the moſt tender of any ſpirituſous Liquor, and thoſe are much more ſenſibly affected with the variations of heat and cold then other more flegmatick and ponderous Liquors, and as capable of receiving a deep tincture, and keeping it, as any Liquor whatſoever; and (which makes it yet more acceptable) is not ſubject to be frozen by any cold yet known. When I have thus filled it, I can very eaſily in the forementioned flame of a Lamp ſeal and joyn on the head of it.

Then, for graduating the ſtem, I fix that for the beginning of my diſviſion where the ſurface of the liquor in the ſtem remains when the ball is placed in common diſtilled water, that is ſo cold that it juſt begins to freeze and ſhoot into flakes; and that mark I fix at a convenient place of the ſtem, to make it capable of exhibiting very many degrees of cold, below that which is requiſite to freeze water: the reſt of my diſviſions, both above and below this (which I mark with a [o] or nought) I place according to the Degrees of *Expansion*, or *Contraction* of the Liquor in proportion to the bulk it had when it indur'd the newly mention'd freezing cold. And this may be very eaſily and accurately enough done by this following way; Prepare a Cylindrical veſſel of very thin plate Braſs or Silver, A B C D of the figure Z; the Diameter A B of whoſe cavity let be about two inches, and the depth B C the ſame; let each end be cover'd with a flat and ſmooth plate of the ſame ſubſtance, cloſely ſoder'd on, and in the midſt of the upper cover make a pretty large hole E F, about the bigneſs of a fifth part of the Diameter of the other; into this faſten very well with cement a ſtraight and even Cylindrical pipe of Glaſs, E F G H, the Diameter of whoſe cavity let be exactly one tenth of the Diameter of the greater Cylinder. Let this pipe be mark'd at G H with a Diamant, ſo that G from E may be diſtant juſt two inches, or the ſame height with that of the cavity of the greater Cylinder, then divide the length E G exactly into 10 parts, ſo the capacity of the hollow of each of theſe diſviſions will be $\frac{1}{1000}$ part of the capacity of the greater Cylinder.

der. This veſſel being thus prepared, the way of ating the *Thermometers* may be very eaſily thus per-

Fill this Cylindrical veſſel with the ſame liquor. *Thermometers* are fill'd, then place both it and the *Thermometer* graduate, in water that is ready to be frozen, and by the liquor in the *Thermometer* to the firſt marke or [o] the liquor in the Cylindrical veſſel, that the ſurface the lower end of the ſmall glaſs-Cylinder; then ve ally warm the water in which both the *Thermometer* veſſel ſtand, and as you perceive the ting'd liquor t with the point of a Diamond give ſeveral marks on *Thermometer* at thoſe places, which by comparing the Stems, are found to correſpond to the diſviſions of t and having by this means marked ſome few of the Stem, it will be very eaſie by theſe to mark all t and accordingly to aſſign to every diſviſion a proper

A *Thermometer*, thus marked and prepared, will ment to make a Standard of heat and cold that can being ſealed up, it is not at all ſubject to variation or ble to be changed by the varying preſſure of the kind of *Thermometers* that are open to the Air are li ceed.

This property of Expansion with Heat, and Cont not peculiar to Liquors only, but to all kind of ſoli ally Metals, which will more manifeſtly appear by t

Take the Barrel of a Stopcock of Braſs, and let th fitted to it, be riveted into it, ſo that it may ſlip, and be then heat this Cock in the fire, and you will find the you will not be able to turn it round in the Barrel to cool again, as ſoon as it is cold it will be as movea turned as before.

This Quality is alſo very obſervable in *Lead*, *Ti Pitch*, *Roſin*, *Bees-wax*, *Butter*, and the like; all which, if you ſuffer gently to cool, you ſhall find the parts to ſubſide and fall inwards, loſing that plumpneſs a whilſt in fuſion. The like I have alſo obſerved in of *Antimony*, which does very neer approach the na

But becauſe theſe are all Examples taken from Glaſs, and argue only, that poſſibly there may be the Glaſs, not that really there is; we ſhall by three or deavour to manifeſt that alſo.

And the Firſt is an Obſervation that is very obvi drops, to wit, that they are all of them terminated v regular Surface, eſpecially about the ſmaller part whole length of the ſtem; as about D, and from th Surface, which would have been round if the dro is, by being quenched haſtily, very irregularly flatte